

Sub D11
C6
28. An intracorporeal implant, comprising a substrate selected from the group consisting of metals, polymers, and a combination thereof and having a protective self-repairing coating thereon which has a self sealing outer coating component having a thickness of less than 100 nm, having nano-crystallinity and comprising a compound which is selected from the group consisting of aluminum nitride, zirconium nitride and hafnium nitride and which is capable of forming a hydrate or hydroxide compound upon contact with an oxygen containing environment.

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30. The implant of Claim 28 wherein the aluminum compound is aluminum nitride.

REMARKS

In the aforesaid Office Action claims 1-20, 28-31, and 33 were finally rejected by the Examiner under 35 USC §102(b) as being anticipated by Aita (US 5,472,795). In this rejection the Examiner noted column 2, lines 61-67; column 3, lines 1-24 as referencing ceramics such as nitrides and carbides. The Examiner also refers to column 5, lines 35-51 as describing ceramic layer having a thickness of 30 – 1000 nm. The applicants note with appreciation the allowance of claims 21-27.

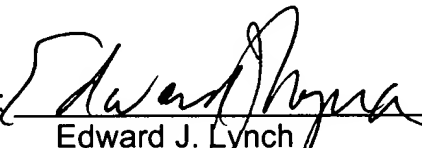
Applicants claims are directed to a self-repairing coating which has an outer component which is water swellable and which is formed of a material selected from the group consisting of aluminum nitride, zirconium nitride and hafnium nitride. While Aita discloses multiple layered coatings which broadly include nitrides and carbides and coatings which have thicknesses in the nano range, there is no disclosure which teaches or suggests a multilayered coating in which the outer component of the coating

is water swellable. Moreover, there is no teaching or suggesting in Aita regarding a water swellable outer layer formed of aluminum nitride, zirconium nitride or hafnium nitride. compound.

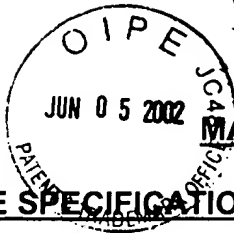
The Examiner makes reference to a teaching in Aita of ceramic layers between 30 and 1000 nm, but there is no teaching or suggestion in Aita of the specific coating layers less than 100 nm in thickness.

In view of the lack of teachings described above, applicants believe that the rejection of the claims under 35 USC §102(b) based on the Aita reference is not supportable. Reconsideration and an early allowance of the claims is earnestly solicited. A marked-up copy of the above amendments noting changes made to the specification and the claims is attached.

Respectfully submitted,

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MARKED-UP COPY INDICATING CHANGES
IN THE SPECIFICATION

On page 1, replace the paragraph starting on line 7 with the following paragraph:

--Biomaterials are synthetic materials used to replace or augment a part of a living system or to function in contact with living tissue. Among the many causes for mortality among human beings, cardiovascular diseases account for a major portion of such deaths. Therefore, continuous improvements in the development of new and improved biomaterials capable of replacing parts of the cardiovascular system is extremely important. The primary requirements for biomaterials for long-term implants, e.g. heart valve prostheses, stents, and vascular grafts, are biocompatibility, thromboreactivity, nontoxicity, and durability. Furthermore, biomaterials should be nonirritating to tissue and nondegradable in the harsh physiological environment, neither absorbing blood constituents nor releasing foreign substance into the bloodstream.

On page 4 replace the paragraph starting on line 6 with the following paragraph:

--Generally, the preferred nanostructure protective coating comprises a plurality of nano-scale inner ceramic layers comprising zirconia, titania, alumina, and an outer layer formed of a nitride based compound selected from the group consisting of aluminum nitride, zirconium nitride and hafnium nitride.--

IN THE CLAIMS

Please amend claims 1, 12, 13, 14, 15, 18, 28 and 30 to read as follows:

1. An intracorporeal device having a protective self-repairing coating on a surface thereof, comprising:
 - a. an inner coating component having at least one layer formed of ceramic material on the surface of the device; and
 - b. an outer coating component having at least one layer less than 100 nm thick formed of a water swellable ceramic material selected from the group consisting of aluminum nitride, zirconium nitride and hafnium nitride on the inner coating component.
12. The intracorporeal device of Claim 1 wherein the inner [and outer coating components have] component has a thickness of up to about a micron.
13. The intracorporeal device of Claim 5 wherein each of the inner and outer coating components have a thickness in a range from about 1 to 50 [nanometers] nm.
14. The intracorporeal device of Claim 1 wherein the at least one layer on the surface of the device includes a plurality of nano-scale ceramic layers independently forming a hardness-imparting ceramic coating [component] layer and a toughness-imparting ceramic coating [component] layer.
15. The intracorporeal device of Claim 14 wherein each of the hardness-imparting and the toughness-imparting coating [components] layer has a thickness independently ranging from about 1 to about 100 nm.

18. A nanostructure protective self-repairing coating for a substrate, the coating comprising an outer coating component less than 100 nm thick comprising a compound selected from the group consisting of aluminum nitride, zirconium nitride and hafnium nitride which is capable of forming a hydrate or hydroxide compound upon contact with an oxygen containing environment and an inner coating component secured to the substrate comprising a bilayer of ceramic materials.

28. An intracorporeal implant, comprising a substrate selected from the group consisting of metals, polymers, and a combination thereof and having a protective coating thereon which has a self sealing outer coating component having a thickness of less than 100 nm, having nano-crystallinity and comprising a compound which is selected from the group consisting of aluminum nitride, zirconium nitride and hafnium nitride and which is capable of forming a hydrate or hydroxide compound upon contact with an oxygen containing environment.

30. The implant of Claim [29] 28 wherein the aluminum compound is aluminum nitride.